

U.S. Patent Application Serial No. 10/520,282
Amendment filed February 11, 2008
Reply to OA dated October 11, 2007

AMENDMENTS TO THE CLAIMS:

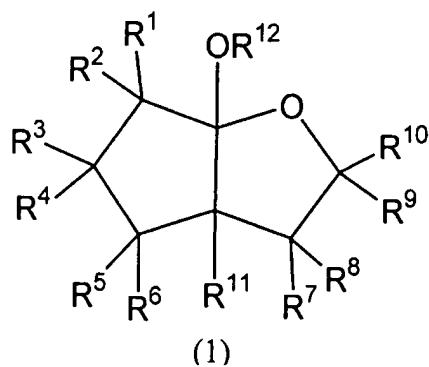
Please cancel claim 1 without prejudice or disclaimer, and amend claims 2-9, as follows.

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Canceled).

Claim 2 (Currently amended): A 2-oxabicyclo[3.3.0]octane compound of the following formula (1),

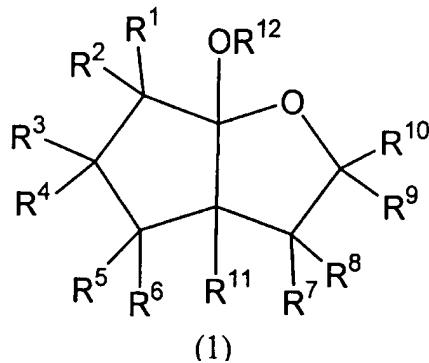


wherein R^1 - R^{10} individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R^{11} represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group,

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a substituted or unsubstituted alkenyloxycarbonyl group, a substituted or unsubstituted aryloxycarbonyl group, or a substituted or unsubstituted alkenyl group, and R¹² represents a substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group The compound according to claim †, and wherein R¹² is a substituted or unsubstituted chiralic secondary hydrocarbon group.

Claim 3 (Currently amended): A 2-oxabicyclo[3.3.0]octane compound of the following formula (1),

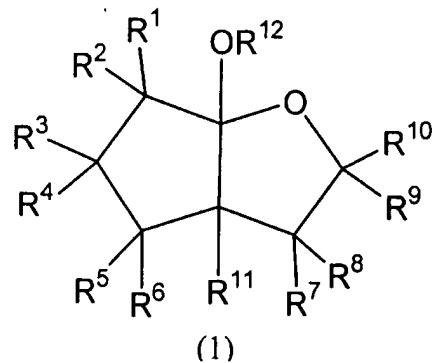


wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group, a substituted or unsubstituted alkenyloxycarbonyl group, a substituted or unsubstituted

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aryloxycarbonyl group, or a substituted or unsubstituted alkenyl group, and R¹² represents a substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group The compound according to claim 1, and wherein R¹² is a chiralic secondary hydrocarbon group having a crosslinked structure or a chiralic secondary alkyl group substituted with an alkoxy carbonyl group.

Claim 4 (Currently amended): An A method for optical resolution characterized by using an optical-resolution agent comprising at least one 2-oxabicyclo[3.3.0]octane compound of the following formula (1),

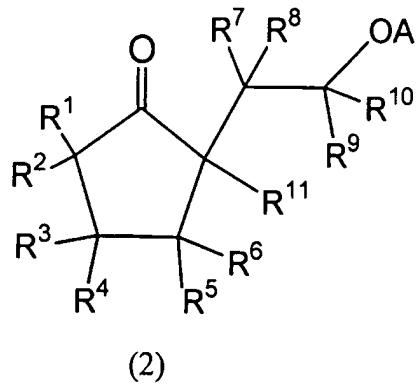


wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group, a substituted or unsubstituted alkenyloxy carbonyl group, a substituted or unsubstituted

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aryloxycarbonyl group, or a substituted or unsubstituted alkenyl group, and R¹² represents a substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group.

Claim 5 (Currently amended): A process for producing a 2-oxabicyclo[3.3.0]octane compound according to claim 1 comprising reacting a cyclopentanone compound of the formula (2),



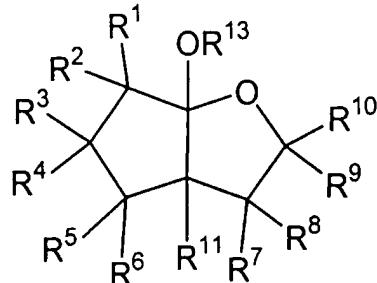
(2)

wherein the ~~R¹-R¹⁰~~ groups are the same as in the formula (1) R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group, a substituted or unsubstituted

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alkenyloxycarbonyl group, a substituted or unsubstituted aryloxycarbonyl group, or a substituted or unsubstituted alkenyl group and A is a hydrogen atom or a protective group for a hydroxyl group, with an optically active alcohol of the formula R¹²OH, wherein R¹² is the same as in the formula (1), represents a substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group, in the presence of an acid catalyst.

Claim 6 (Currently amended): A process for producing a 2-oxabicyclo[3.3.0]octane compound according to claim 1 comprising reacting a 2-oxabicyclo[3.3.0]octane compound of the formula (3),



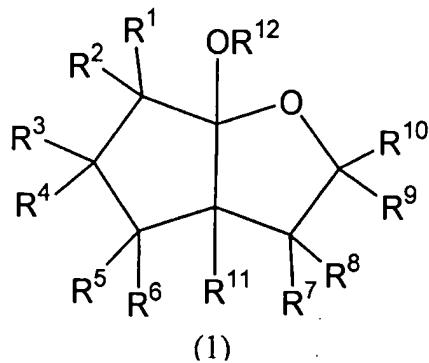
(3)

wherein the R¹-R¹⁰ groups are the same as in the formula (1) R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl

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group, a substituted or unsubstituted alkoxy carbonyl group, a substituted or unsubstituted alkenyloxy carbonyl group, a substituted or unsubstituted aryloxy carbonyl group, or a substituted or unsubstituted alkenyl group and R¹³ is a substituted or unsubstituted hydrocarbon group, with an alcohol of the formula R¹²OH, wherein R¹² is as defined above represents a substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group, in the presence of an acid catalyst.

Claim 7 (Currently amended): A method for separating a diastereomer mixture of 2-oxabicyclo [3.3.0]octane compound compounds according to claim 1 of the following formula (1),



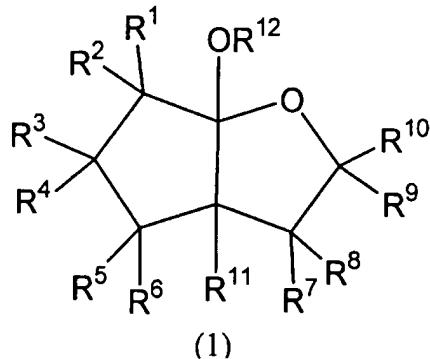
wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group,

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a substituted or unsubstituted alkenyloxycarbonyl group, a substituted or unsubstituted aryloxycarbonyl group, or a substituted or unsubstituted alkenyl group, and R¹² represents a substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group,

comprising processing the diastereomer mixture of 2-oxabicyclo [3.3.0]octane compound compounds of the formula (1) using a simulated moving bed chromatography to separate into individual diastereomers.

Claim 8 (Currently amended): A method for separating a diastereomer mixture of 2-oxabicyclo [3.3.0]octane compound compounds according to claim 1 of the following formula (1),



wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl

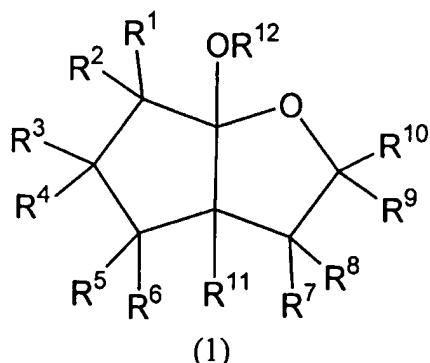
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group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group,
a substituted or unsubstituted alkenyloxy carbonyl group, a substituted or unsubstituted
aryloxy carbonyl group, or a substituted or unsubstituted alkenyl group, and R¹² represents a
substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or
unsubstituted alkenyl group, R¹² is a chiral group,

comprising distilling the diastereomer mixture of 2-oxabicyclo [3.3.0]octane ~~compound~~
compounds of the above formula (1) to separate into individual diastereomers.

Claim 9 (Currently amended): A method for optically resolving alcohol of the formula R¹⁴OH, wherein R¹⁴ represents a substituted or unsubstituted hydrocarbon group having an asymmetric carbon atom, comprising,

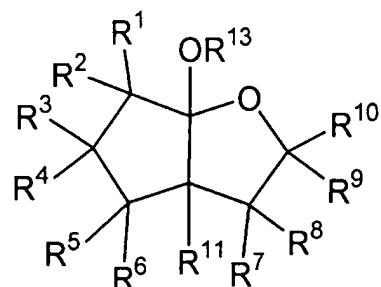
a step of separating a diastereomer mixture of 2-oxabicyclo [3.3.0]octane ~~compound~~
compounds according to claim 1 of the following formula (1),



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wherein R¹-R¹⁰ individually represent a hydrogen atom or a substituted or unsubstituted alkyl group having 1-20 carbon atoms, R¹¹ represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkynyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted cycloalkenyl group, a substituted or unsubstituted aryl group, formyl group, a substituted or unsubstituted acyl group, a substituted or unsubstituted alkoxy carbonyl group, a substituted or unsubstituted alkenyloxy carbonyl group, a substituted or unsubstituted aryloxy carbonyl group, or a substituted or unsubstituted alkenyl group, and R¹² represents a substituted or unsubstituted hydrocarbon group, provided that when R¹¹ is a substituted or unsubstituted alkenyl group, R¹² is a chiral group into individual diastereomers,

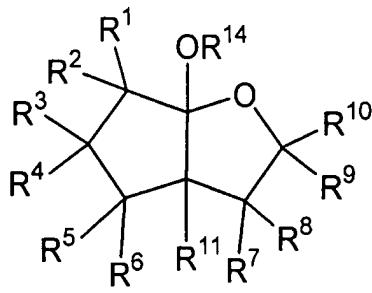
a step of reacting one of the separated diastereomers with an alcohol of the formula R¹³OH, wherein R¹³ is a substituted or unsubstituted hydrocarbon group, in the presence of an acid catalyst to obtain a 2-oxabicyclo[3.3.0]octane compound of the formula (3),



wherein R¹-R¹¹ are the same as in the formula (1) and R¹³ is as defined above,

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a step of reacting the compound of the formula (3) with an optical isomer mixture of alcohol of the formula $R^{14}OH$, wherein R^{14} is as defined above, in the presence of an acid catalyst to obtain a diastereomer mixture of the formula (4),



(4)

wherein R^1-R^{11} and R^{14} are the same as defined above,

a step of separating the resulting diastereomer mixture into individual diastereomers, and
a step of reacting one of the separated diastereomers with an alcohol of the formula $R^{15}OH$,
wherein R^{15} represents a substituted or unsubstituted hydrocarbon group, in the presence of an acid catalyst to obtain an optically active alcohol of the formula $R^{14}OH$, wherein R^{14} is as defined above.

Claim 10 (Original): The method according to claim 9, wherein the step of separating the diastereomer mixture of the compound of the above formula (4) into individual diastereomers comprises processing the diastereomer mixture using simulated moving bed chromatography to separate into individual diastereomers.

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Claim 11 (Original): The method according to claim 9, wherein the step of separating the diastereomer mixture of the compound of the above formula (4) into individual diastereomers comprises distilling the diastereomer mixture to separate into individual diastereomers.

Claim 12 (Previously presented): The method according to claim 11, wherein the optical active alcohol of the formula $R^{14}OH$, wherein R^{14} is as defined above, and the compound of the above formula (3) are isolated by reacting the separated diastereomer of the compound of the formula (4) with an alcohol of the formula $R^{13}OH$, wherein R^{13} is as defined above, in the presence of an acid catalyst, and the isolated compound of the formula (3) is reused as an optical resolution agent of alcohol.

Claim 13 (Previously presented): The method according to claim 9, wherein the optical active alcohol of the formula $R^{14}OH$, wherein R^{14} is as defined above, and the compound of the above formula (3) are isolated by reacting the separated diastereomer of the compound of the formula (4) with an alcohol of the formula $R^{13}OH$, wherein R^{13} is as defined above, in the presence of an acid catalyst, and the isolated compound of the formula (3) is reused as an optical resolution agent of alcohol.

Claim 14 (Previously presented): The method according to claim 10, wherein the optical active alcohol of the formula $R^{14}OH$, wherein R^{14} is as defined above, and the compound of the

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above formula (3) are isolated by reacting the separated diastereomer of the compound of the formula (4) with an alcohol of the formula $R^{13}OH$, wherein R^{13} is as defined above, in the presence of an acid catalyst, and the isolated compound of the formula (3) is reused as an optical resolution agent of alcohol.